Department of Marine Resources
Site Review #2014-12

Cooke Aquaculture USA Inc.
133 Small's Point Road
Machiasport, ME 04655
207-255-6714

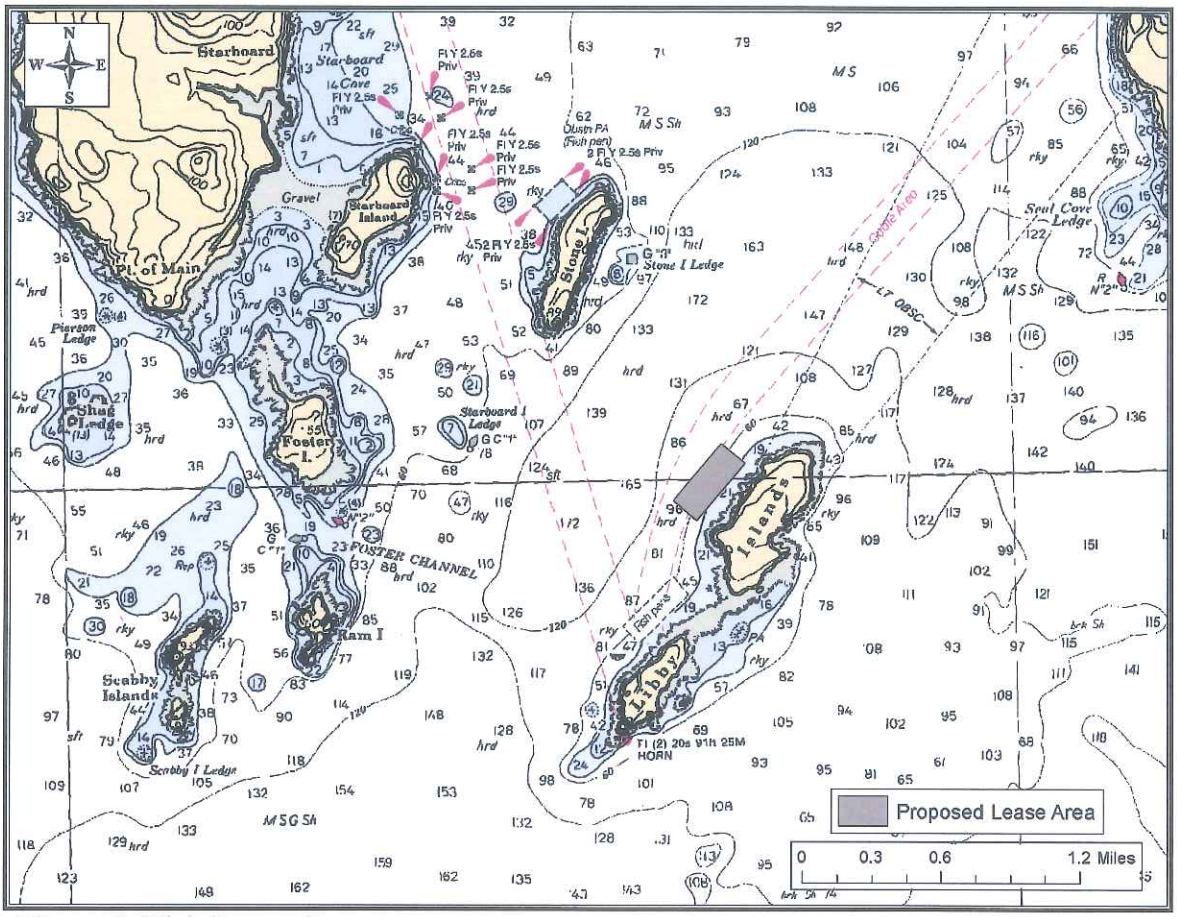


Figure 1: Vicinity map*

Location: Northwest side of Big Libby Island, Machiasport, Washington County

Purpose: Culture of Atlantic salmon (*Salmo salar*)

Site Review: Jon Lewis, Marcy Nelson, and Flora Drury
Report Preparation: Jon Lewis, Marcy Nelson, and Flora Drury November 2, 2016

** All figures in this report were created in ArcMap version 10.1 using digitized NOAA Nautical Charts or geo-referenced aerial photographs provided by The Maine Office of GIS (Low_Tide_Down_East_2009).*

On July 21, 2016 Maine Department of Marine Resources (MDMR) scientists Jon Lewis, Marcy Nelson, and Flora Drury conducted a site assessment of the proposed aquaculture lease. Brad Allen and Thomas Schaeffer of The Maine Department of Inland Fisheries and Wildlife (MDIFW), Chris Bartlett from Maine Sea Grant, and Jennifer Robinson and Frank Lank from Cooke Aquaculture USA, Inc. were also present during this site assessment. MDMR, MDIFW, and Maine Sea Grant staff members were transported to the site in a Cooke Aquaculture, Inc. vessel, arriving at 10:36 a.m.

The applicant is applying for a standard (10-year) lease to culture Atlantic salmon (*S. salar*) from smolt to market size over an 18-36 month period in the proposed lease tract. 18 polar circle net pens measuring100 meters in circumference and stocked with approximately 30,000 fish each, are proposed to fill this lease. The proposed pens, connected via a mooring system, would contain fish within a 1 3/8" mesh net surrounded by a 4" mesh net to deter predators. According to the applicant, the entire system would extend ~21 feet below the surface of the water. A cone barge feeding system used for feeding and feed storage is also proposed for the lease site and would be located between the pen structures and Big Libby Island if granted.

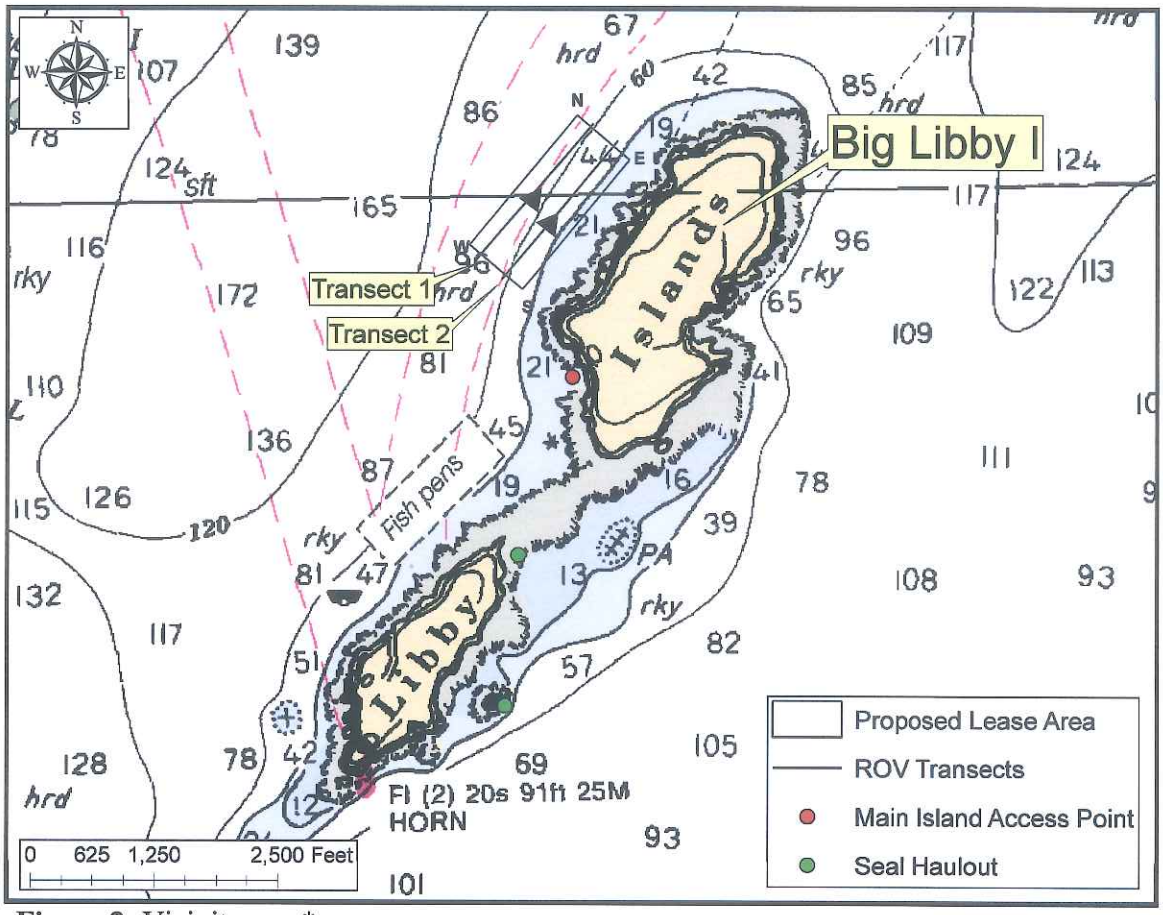


Figure 2: Vicinity map*

Image 1: View looking northeast at Big Libby Island (foreground) and Cross Island (background) from northern portion of proposed lease site.

Image 2: View looking east towards Big Libby Island from the eastern boundary of the proposed lease site.

Image 3: View looking southwest towards Little Libby Island from southern portion of the proposed lease site.

General Characteristics

Bottom Topography and Sediment Composition

On July 21, 2016, MDMR examined the bottom of the proposed lease site with a Remotely Operated Vehicle (ROV) and associated underwater video camera; two transects were conducted (Figure 2). The video from the outer transect of the proposed lease site shows several underwater ledges while the video from the inner transect shows a relatively flat bottom. The bottom of the proposed lease site consists of cobble and shell sitting atop firm sand sediment. Larger rocks are located occasionally throughout the site.

Depth

Machiasport, Machias River, Maine[1]
(44.6983° N, 67.3933° W)

Date	Time	Height (ft)
7/21/16	12:15 AM	13.85 H
7/21/16	6:32 AM	-0.73 L
7/21/16	12:42 PM	13.21 H
7/21/16	6:49 PM	-0.01 L

[1] http://tbone.biol.sc.edu/tide/tideshow.cgi?site=Machiasport%2C+Machias+River%2C+Maine&units=f

Depths within the proposed lease were collected at 10:36 am on July 21, 2016. The tide was in a flood stage at this time. The predicted time of high tide was 12:42 pm with a tidal height predicted to be 13.21 feet above mean low water (MLW). Depths within the proposed lease site ranged from 45' to 96'. The eastern boundary of the proposed lease site, which sits closest to Big Libby Island, averaged roughly 45' to 55' in depth. Correcting for tidal range on that date would derive water depths approximately 3.5 feet higher at high tide and water depths approximately 9 feet lower at mean low water (+/- 0.0').

There are adequate depths at all tidal stages to accommodate the use of 100-meter polar circle net pens, with nets that extend ~21 feet below the surface of the water.

Currents

A study of currents in the area was conducted by the applicant on March 24 and 25, 2014. The location of this study was not declared in the application. Current data are provided showing an average current velocity of 34.82 cm/sec at the cage bottom and 30.30 cm/sec at the sea floor. These currents are more than adequate for flushing the site of fine particles. No information on current direction was provided. According to a previous study, the dominant currents in the area flow to the northeast and the southwest[2].

Position and Distances to Shore

The application coordinates and metes and bounds describing the proposed standard lease are below. POSAID Positioning Software was used to verify the distances and bearings between corners. Distances to shore were determined using the measuring tool in ArcMap 10.1, digitized NOAA Nautical Charts, Garmin MapSource charting software, digital orthophotography provided by the Maine Office of GIS (*Low_Tide_Down_East_2009*), and the application coordinates listed below.

Application Coordinates – 27.33 acres (Figure 2)

Corner	Latitude	Longitude
W	44° 34' 55.08"N	67° 21' 47.28"W *then 1699.68 feet at 41.00° True to*
N	44° 35' 07.75"N	67° 21' 31.87"W *then 700.22 feet at 131.00° True to*
E	44° 35' 03.21"N	67° 21' 24.57"W *then 1700.16 feet at 220.99° True to*
S	44° 34' 50.54"N	67° 21' 39.98"W *then 700.64 feet at 311.03° True to W.*

[2] Current velocity and direction study: Libby Island, Machias Bay Maine. MER Assessment Corporation. 28 Feb 2003.

Approximate Distances From Lease Boundary (Figure 2):	
E Corner to Nearest Point, Big Libby Island (MLW):	~165 feet to the east
E Corner to Nearest Point, Big Libby Vegetated Upland	~300 feet to the east
E Boundary to Nearest Point, Big Libby Island (MLW):	~155 feet to the east
S Corner to Vegetated Upland, Little Libby Island:	~2,670 feet to the south
S Corner to Island Access Point (MLW):	~970 feet to the southeast
Western Corner to Nearest Point, Stone Island (MLW)	~4,510 feet to the west
Navigational Aid G "3" Stone I Ledge	~4,560 feet to the northwest
Navigational Aid GC "1" Starboard I Ledge	~4,750 feet to the west

The criteria MDMR uses to determine the suitability of an aquaculture operation to a particular area (DMR Regulations Chapter 2.37(1) (A)) are discussed, with respect to the application, below:

(1) Riparian Owners Ingress and Egress

Big Libby Island is owned by the Maine Department of Inland Fisheries and Wildlife (MDIFW). No moorings, docks, or infrastructure designed for ingress and egress were observed on July 21, 2016. Brad Allen, Wildlife Biologist and Bird Group Leader for MDIFW, identified the beach on the island's southwest side as the main landing point used to access Big Libby Island (Figure 2)[3]. This beach is located approximately 970 feet to the southeast of the proposed lease area and therefore ingress and egress would not be impacted if the lease were granted.

The US Fish and Wildlife Service own Little Libby Island, which is located ~2,670 feet to the south of the proposed lease site. The proposed lease would not interfere with riparian owners safely navigating to and from the shores of Little Libby Island.

(2) Navigation

The proposed lease is located northwest of Big Libby Island. The main navigational channel to the west of the island is marked by navigational markers GC "1" and G "3". Greater than 4,000 feet of navigable water would remain available in this channel with the inclusion of the proposed lease (Figure 1).

At the closest point, approximately 150 feet remains between the proposed lease site and Big Libby Island to the east. Maneuvering between the proposed lease and Big Libby Island would be limited.

[3] Personal communication with Brad Allen of Maine Department of Inland Fisheries and Wildlife. 8/11/16.

(3) Fishing

On July 21, 2016, approximately 18 lobster pot buoys were observed north and east of the proposed lease. Additionally, the video transects conducted by MDMR show a commercially harvestable amount of sea scallops (*P. magellanicus*) on the bottom of the proposed lease site. According to Wade Day, Harbormaster for the town of Machiasport, in addition to the commercial lobstering observed by MDMR, scalloping and sea urchin harvesting occur within the area of the proposed lease[4]. In an August 4, 2016 telephone conversation MDMR Marine Patrol Officer Russell Wright described the area of the proposed lease as "traditional scallop bottom for years and years" and characterized it as "heavily fished for scallops". The area was under a conservation closure in 2016 and is scheduled to be reopened in 2017[5].

Approval of the proposed lease would prevent lobstering, scalloping, and the harvest of sea urchins within the lease boundaries. Lobster boats would be able to maneuver between the lease and the shoreline which sit ~150' apart at their closest point (MLW). Scallop and urchin draggers would be prevented from utilizing the proposed lease site area and maneuvering between the proposed lease and Big Libby Island would be limited.

(4) Other Aquaculture Uses

The applicant currently holds one lease (MACH LI) for the net-pen culture of finfish within one mile (straight-line distance) of the proposed lease site. MACH LI is located ~1,350 feet from the proposed lease site and is currently pending renewal.

The applicant holds five additional leases within 5 miles (straight-line distance) of the proposal. No other Limited Purpose Aquaculture licenses (LPAs), aquaculture leases, or pending aquaculture leases are located within five miles of the proposed lease site (Figure 3).

Nearby Aquaculture Leases:

Lease Acronym	Acreage	Purpose	Distance
MACH LI	20.09 Acres	Suspended Culture Of Finfish	0.25 Miles
MACH ST	10.04 Acres	Suspended Culture Of Finfish	1.25 Miles
MACH II	39.96 Acres	Suspended Culture Of Finfish	1.5 Miles
MACH CI2	79.56 Acres	Suspended Culture Of Finfish	2.79 Miles
MACH CIN	34.88 Acres	Suspended Culture Of Finfish	3.1 Miles
MACH CW2	34.48 Acres	Suspended Culture Of Finfish	4.38 Miles

[4] Wade Day, Machiasport Harbormaster. Harbormaster Questionnaire. 8/7/14.
[5] http://www.maine.gov/dmr/science-research/species/scallops/management/2015-16/rotational.html

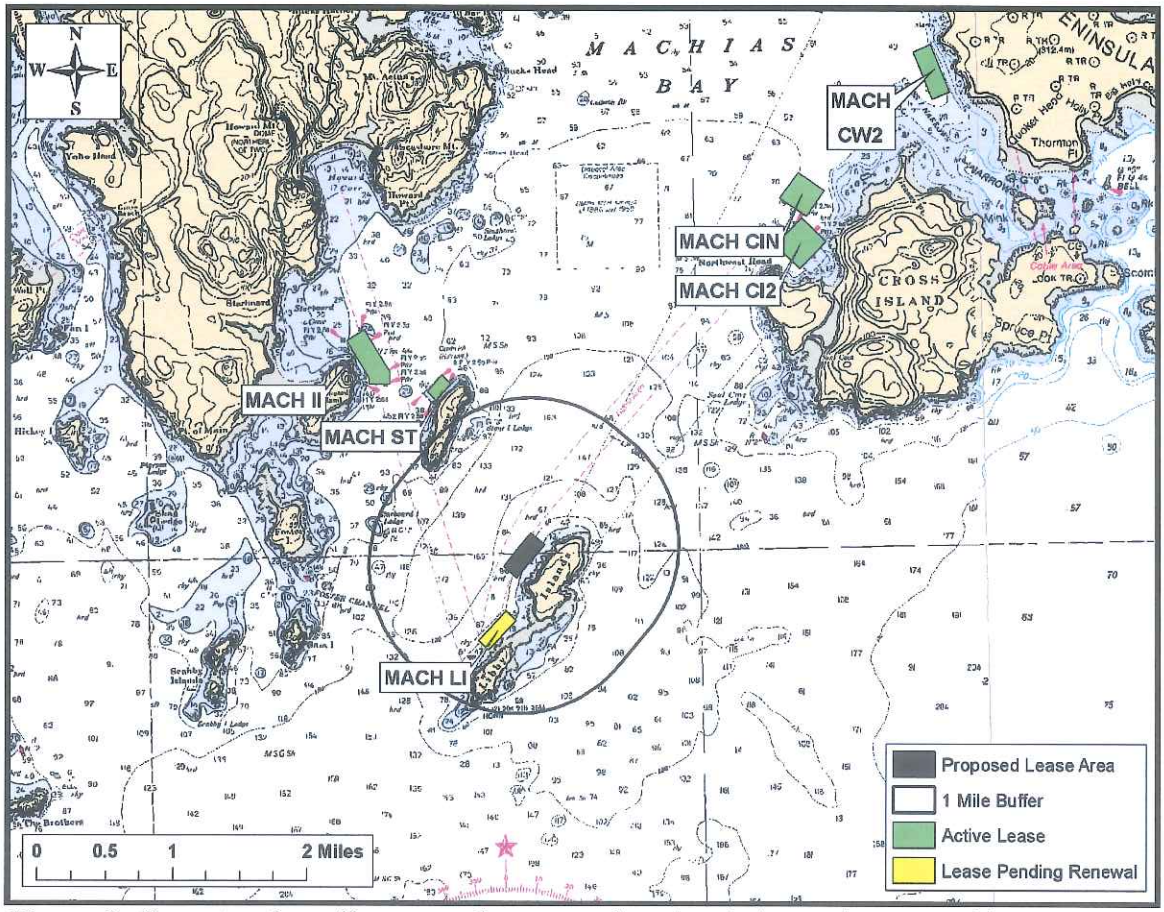


Figure 3: Current and pending aquaculture operations in relation to the proposal*

(5) Existing System Support

A) Flora and fauna from underwater video observations

On July 21, 2016, Maine Department of Marine Resources (MDMR) staff documented the benthic ecology within the proposed lease area using an underwater Remotely Operated Vehicle (ROV) and associated underwater video camera (see Figure 2 for a graphic representation of the approximate courses followed).

The bottom of the proposed lease area is characterized by hard sand, cobble, and shell. What was presumed to be spiral tufted bryozoan (*Bugula turrita*) was the dominant species observed; the species covered rocks and shells along the bottom of the proposed site. Sea scallops (*Placopecten magellanicus*) were also seen commonly throughout the proposed lease site.

The relative abundance of epibenthic macro-flora and fauna observed throughout the video transects is described below:

Species and Abundances
Rock crab (*Cancer sp.*) – rare
Spiral tufted bryozoan (*Bugula turrita*)– abundant
Sea scallop (*Placopecten magellanicus*) – common
Palmate sponge (*Isodictya palmata*) – rare
Sea star (*Asterias sp.*) - rare
American lobster (*Homarus americanus*) – rare
Dulse (*Rhodymenia palmata*) - rare
Northern red anemone (*Urticina felina*) – rare
Winter flounder – rare
Hermit crab (*Pagurus sp.*) – rare

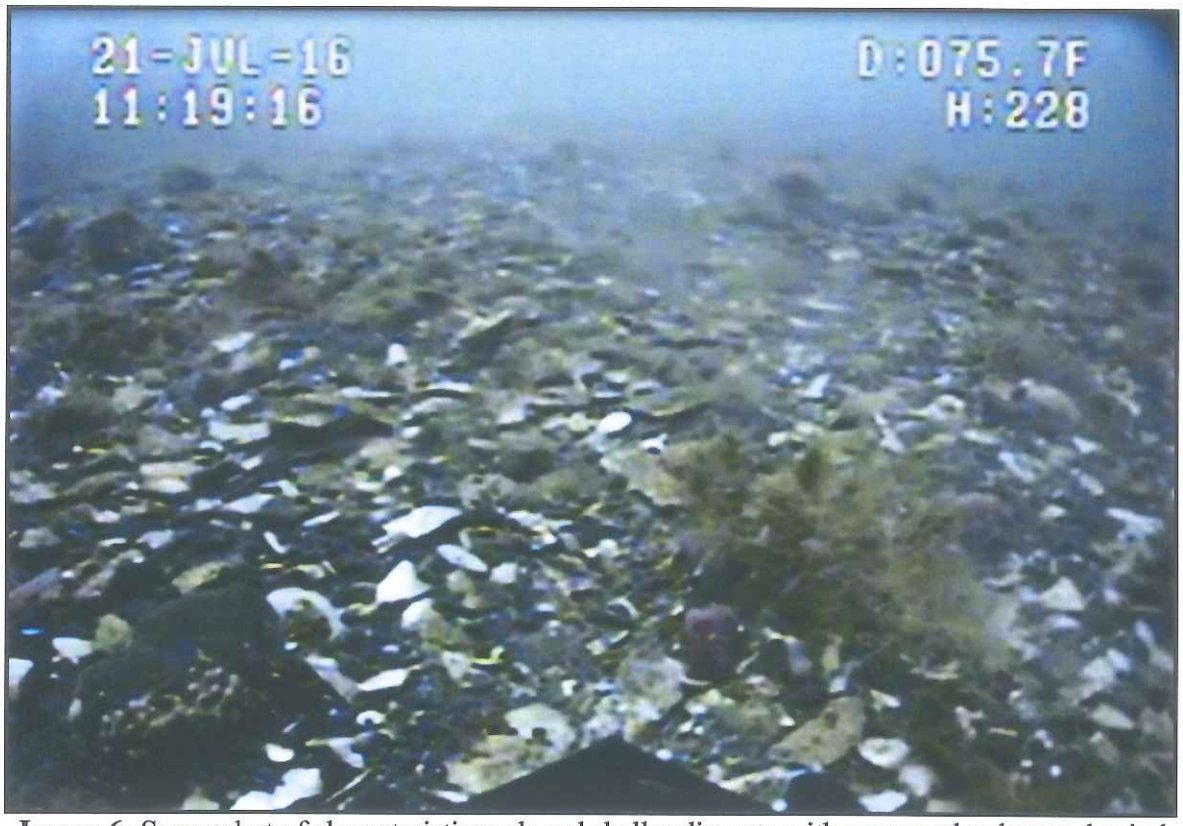


Image 6: Screenshot of characteristic rock and shell sediments with commonly observed spiral tufted bryozoan (*B. turrita*) seen in video transect

Image 7: Screenshot of characteristic sea scallop (*P. magellanicus*) seen in video transect

B) Eelgrass (*Z. marina*)

Eelgrass surveys conducted in 2009 show the nearest historical eelgrass beds ~1.9 miles from the proposed lease site (Figure 4).

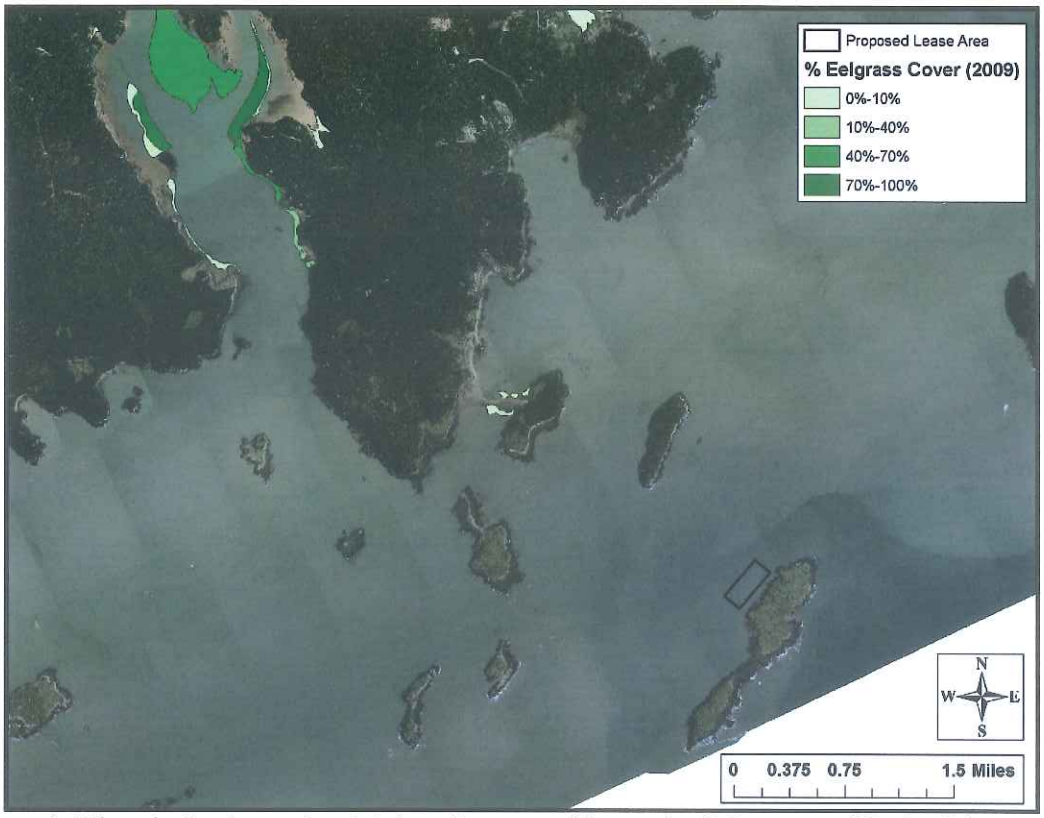


Figure 4: Historical eelgrass in vicinity of proposed lease site. Map created in ArcMap version 10.1 using geo-referenced aerial photographs and maps provided by The Maine Office of GIS (*Low_Tide_Down_East 2009 and Eelgrass_2010*).

C) Marine Mammals

Harbor seals (*Phoca vitulina*) were observed hauled out on ledges at two locations in the vicinity of the proposed lease site during the MDMR site review (Image 8 and Figure 2). One haul-out was located on the northeast tip of Little Libby Island, approximately 0.5 miles from the proposed lease site. The second haul-out was located on the southeast side of Little Libby Island, approximately 0.8 miles from the proposed lease site.

Image 8: Harbor seals (*Phoca vitulina*) hauled out on the southeast shore of Little Libby Island, Machiasport (July 21, 2016).

D) Seabirds

Please refer to Attachment 1: Big Libby Island, Machiasport, Maine: Maine Department of Inland Fisheries and Wildlife (MDIFW) Summary of Facts and Conclusions Related to 2014 Proposed Aquaculture Lease by Cooke Aquaculture.

(6) Interference with Public Facilities

Big Libby Island is owned by the Maine Department of Inland Fisheries and Wildlife (MDIFW) and was purchased by MDIFW for "the acquisition of waterfowl habitat and waterfowl management activities"[6]. The island is listed as Significant Wildlife Habitat – Seabird Nesting Islands - under the Natural Resources Protection Act of 1988. At the closest point, the proposed lease site is located ~150 feet (MLW) from Big Libby Island.

Little Libby Island, located more than 2,000 feet to the south of the proposed lease site, is owned by the US Fish and Wildlife Service and is part of the Maine Coastal Islands National Wildlife Refuge.

[6] Maine Department of Inland Fisheries and Wildlife (MDIFW). MDIFW Summary of Facts and Conclusions Related to 2014 Proposed Aquaculture Lease by Cooke Aquaculture.

(7) Lighting

According to the application, work beyond daylight hours would be limited to "unusual circumstances such as storm events and possible harvesting". No permanently installed surface lighting is proposed for use. The applicant proposes the use of 100, 400-watt submerged lights on the proposed lease site to control fish maturation. The applicant plans to use these lights between the months of November and May.

(8) Noise

The applicant proposes to use a feed barge powered by a four-cylinder diesel engine on the lease site, if granted. The applicant also proposes the use of work barges, a net roller, an inboard/outboard engine, a portable welder/generator, and a pressure washer.

The proposed use of noise-generating machinery is outlined below in order of proposed amount of use. According to the application, "[E]quipment, such as the feed barge and the work barge, are equipped with mufflers". The application did not specify housing or muffling for the proposed generator.

Item	Proposed Use
Feed Barge (Four-Cylinder Diesel Engine)	8 Hours/Day Winter 14 Hours/Day Summer
Work Barges	8 Hours/Day Winter 14 Hours/Day Summer
Inboard/Outboard Engine	~Daily March-December
Generator for Lights	November-May
Net Roller	1 Month/Fall 1 Month/Spring
Pressure Washer	20-30 Days/Year
Portable Welder/Generator	14 Days/Year

(9) Visual Impact

The applicant plans to employ 18 polar circle net-pens, each measuring 100 meters in circumference, for the culture of finfish. Each net-pen would have black handrails extending 3 feet above the surface of the ocean and black bird nets, supported by a bird net stand, extending 6 feet above the water.

A cone barge feeding system located between the pen structures and Big Libby Island is also proposed for the lease site. According to the height limitations required by DMR regulations (Chapter 2.37 (1)(A)(10)), this feeding system must sit no more than 20 feet above the surface of the water.

The proposed cone barge would be either gray or almond in color and therefore abide by the color limitations required by DMR Regulations (Chapter 2.37 (1) (A) (10)).

Attachment 1:

Big Libby Island, Machiasport, Maine: Maine Department of Inland Fisheries and Wildlife (MDIFW) Summary of Facts and Conclusions Related to 2014 Proposed Aquaculture Lease by Cooke Aquaculture

BIG LIBBY ISLAND, MACHIASPORT, MAINE

MDIFW SUMMARY OF FACTS AND CONCLUSIONS RELATED TO

2014 PROPOSED AQUACULTURE LEASE BY COOKE AQUACULTURE

Historical Perspective:

- Historical records of colonial seabird nesting on this island date back to 1885. In 1903, records indicate that 1,500 pairs of nesting terns used the island.
- In the late 1980s, Maine Department of Inland Fisheries and Wildlife's (MDIFW) Wildlife Division biologists characterized the island as "one of the most important seabird nesting islands on the coast of Maine" and supported permanent protection through conservation acquisition.
- MDIFW records indicate that an estimated 1,500 nesting common eiders used the island in addition to more than 2,000 nesting seabirds.
- On April 5, 1991 the Department invested $265,000 of state-generated funds through the Maine Duck Stamp program to purchase Big Libby Island for "the acquisition of waterfowl habitat and waterfowl management activities" and to assure permanent habitat protection.
- In 1998, Big Libby was included in a regulatory listing of Significant Wildlife Habitat - Seabird Nesting Islands; a select group of islands that met standards for protection under the Natural Resources Protection Act of 1988, denoting resource values of statewide significance.
- Coastal islands designated as Significant Wildlife Habitat - Seabird Nesting Islands (NRPA 1988) represent less than 10% of all of coastal islands on the coast of Maine.
- MDIFW Bird Group/Research and Assessment Section currently assesses Big Libby Island's ecological significance as one of the top 10 seabird nesting islands in the State.
- U.S. Fish and Wildlife Service (FWS) acquired nearby Little Libby Island in November, 1999 and joined with MDIFW in a collaborative effort to manage the two-island archipelago for seabirds.
- While populations of various nesting seabird species have and continue to fluctuate over time in response to many variables, the offshore juxtaposition of the Libby Island archipelago and the island's physical and vegetative characteristics were key to the Department's assessment and subsequent investment to protect this habitat in perpetuity.
- A pair of Peregrine falcons (State Endangered Species) were recorded nesting on Big Libby Island in 2007. The pair raised three chicks that year. Peregrines nested again in 2008 and have been observed periodically since, but nesting has not been confirmed.
- Harlequin ducks (State Threatened Species) have been observed adjacent to Big Libby Island during the annual Midwinter Waterfowl Survey conducted each year in January.

Biological and Physical Characteristics:

- Big Libby Island is a 95.3 acre island approximately 2.5 miles offshore from the mainland, approximately five miles from the nearest port in Bucks Harbor, Machiasport.
- Big Libby Island is an outer barrier island; its relative remoteness and position within the Gulf of Maine contribute to its biological values and attraction to seabirds (and other wildlife) by being relatively isolated from human disturbance and mammalian predation.
- The island is vegetated by dense, low-growth herbaceous and ericaceous shrubs including Labrador tea, blueberry, cranberry, sheep laurel, bunchberry, and crowberry. Raspberries are a dominant cover type on the island, affording ideal nesting conditions for many species of nesting birds and colonial nesting seabirds.
- The island is surrounded by approximately 60 acres of intertidal habitat which supports specific functions related to nesting seabirds and waterfowl such as feeding, pair bonding, loafing, brood escape cover, and brood rearing. Little Libby Island is connected to Big Libby island by a low tide isthmus.

1992 Application for Aquaculture Development:

- Application submitted by Atlantic Salmon of Maine (ASM) for four contiguous, five acre tracts totaling 20 acres of net pen aquaculture.
- Project site was located southwest of Big Libby Island and north of Little Libby Island, parallel to intertidal habitat and bar which connects the two islands.
- Development included 36 polar circle and 49 steel cage pens.
- Included proposal for 40 X 90 foot feeding/operations barge complete with diesel engine, fuel storage including propane, gasoline, and diesel.
- Operations included numerous support vessels on a daily basis including a 60' delivery barge.
- Project included double predator nets surrounding pens which were identified as a potential source of entanglement and entrapment of foraging birds.
- Through the application materials, communications, literature reviews, and hearing, it became evident that net pen aquaculture of this size and in this type of remote location presented a significant change in the character of place; that there would be an intensity of human and mechanical/equipment operations on a continuous basis involving associated activities, noise and light. The overall impact was expected to be habitat displacement through loss/diminished functions/values, increased losses of disturbance-sensitive species by both project operations as well as exacerbated predation by more aggressive, tolerant species. Other concerns were identified that included potential for unintended introduction of rodent/predators by transportation

and storage of large volume of feed, effects of intended and unintended discharge, spills, unauthorized/untimely island access, development related flotsam, etc.

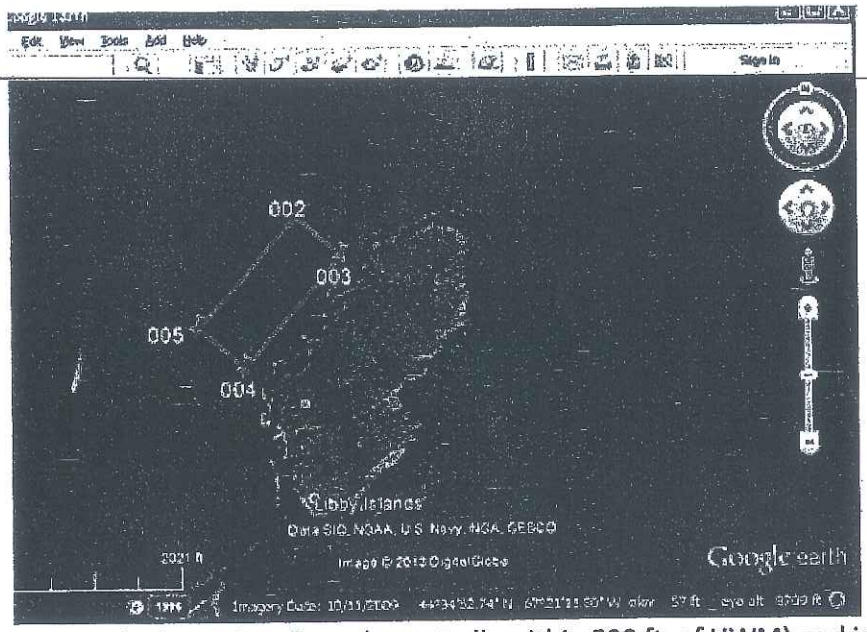
- A literature review of human disturbance impacts on nesting colonial waterbirds was conducted to determine potential effects of this aquaculture development on colonial nesting islands. A majority of studies reported that human-caused disturbances impacted the study species. Strategies, such as establishing set-back distances or buffers, were frequently suggested to lessen the impacts to the most sensitive species.
- In response to the literature review findings, the applicant provided information from a consulting biologist indicating negligible and possibly some positive effects of net pen aquaculture at a nearby facility near a large coastal island. Notably, that coastal island was <u>not</u> a seabird nesting island.
- Department of Marine Resources' (DMRs) Finding of Fact, Conclusions of Law and Decision in November, 1993 concluded that lease activities would not unreasonably interfere with the ability of the lease site and surrounding areas to support existing ecologically significant flora and fauna. This finding was based on, in part,:
    - That many of the nesting birds on the island were capable of habituating to various levels of human activity;
    - That none of the bird species were listed as threatened or endangered;
    - That based on the dimensions of the island, the topographical gradient of the nearest shoreline, and the results of one MDIF&W ground survey in 1992, that many of the nests were out of sight and beyond a ¼ mile distance (*beyond actual scope and resolution of survey*);
    - That the 4 species of nesting seabirds utilizing Big Libby were common in vast numbers along the coast;
    - That the ¼ mile buffer recommendation, while consistent with federal provisions, was only a guideline and not vetted through public rulemaking process.
- Conditions were established on the lease which included a trespass restriction for the lessee and employees during the critical period of April 1 through August 15 nesting period. Two violations of that condition were observed and reported.
- It was noted that the DMR Commissioner could commence revocation procedures if it was determined that substantial aquaculture had not been conducted within the preceding year, or if any of conditions or requirements of the lease or law were not being observed.

Lease Renewals of 2003 and 2008:

- Downsizing of the project occurred in the original 10 year period due to difficulties in maintaining pens and operations in the unpredictably, challenging environment.
- In 2003, MDIFW and FWS joined to oppose initial intimations of an application for a 10 year lease renewal.
- Cooke Aquaculture acquired ASM assets in 2004.
- Without a formal adjudicatory process, MDMR issued a three year extension on the Libby Island lease to November, 2006.
- In 2008, DMR noted "... because the renewal application was timely filed, the lease continues in effect pending a decision on the renewal. Since the last crop of salmon was harvested from this site in October, 2006, the site has not been used for aquaculture, and the site is empty of gear at the present time." (*memo from D.C. Robinson, DMR, 8/11/2008*).
- In the two year period subsequent to the lease site not being used for aquaculture and laying fallow, the lease was not terminated as provided in the 1993 lease decision to permit, or as provided in Sections 2.42 and 2.45 of DMR Aquaculture Lease Regulations.
- In October, 2008, MDIFW requested intervener status in addition to: not requesting a public hearing; noting MDIFW's continued ownership of Big Libby Island as part of the Coast of Maine Wildlife Management Area; noting the island's designation as Significant Wildlife Habitat under the Natural Resources Protection Act (NRPA); noting documented presence by Peregrine falcons (State Endangered Species) in 2007 and 2008 and successful nesting in 2007 (first successful nesting on offshore island in over 100 years) and one of only 23 locations statewide in 2008; declaration of continued opposition to renewal of lease due to disruptive effects of aquaculture operations; noting the FWS site evaluation of recently acquired Little Libby Island and its preferred status for a seabird restoration project; and noting a research project that had been initiated to begin to quantify human disturbance related to aquaculture development. (*letter from K. Elowe, Bureau Director to DMR, 10/21/2008*)
- To date, the original lease has not been terminated, though the site has remained fallow since October, 2006.
- Under provisions of Section 2.45, it appears that the lease submitted in 2008 is being held in a suspended state for "speculative" purposes.

2014 Application for New Site at Big Libby:

- Cooke Aquaculture submitted an Application for Net Pen Culture on 27.3 acres at a new site along the north shoreline of Big Libby Island in May, 2014.
- The development plan proposes the establishment of (18) 100 foot diameter polar circle pens as well as a substantially large, moored feed barge to accommodate 540,000 fish requiring the discharge of 1,630 and 4,600 metric tons for the first and second years respectively for each pen in the array.
- Noise and light factors will be generated by the moored feed barge with 4 cylinder diesel engine, gas and diesel storage, portable welder/generator, pressure washer, numerous support barges and watercraft including 40, 50, and 60' service vessels with inboard and outboard engines operating approximately 8 hours/day during winter and 14 hours/day during summer, and possible deployment of (100) 400 watt submerged lights requiring generator operation from November through May.

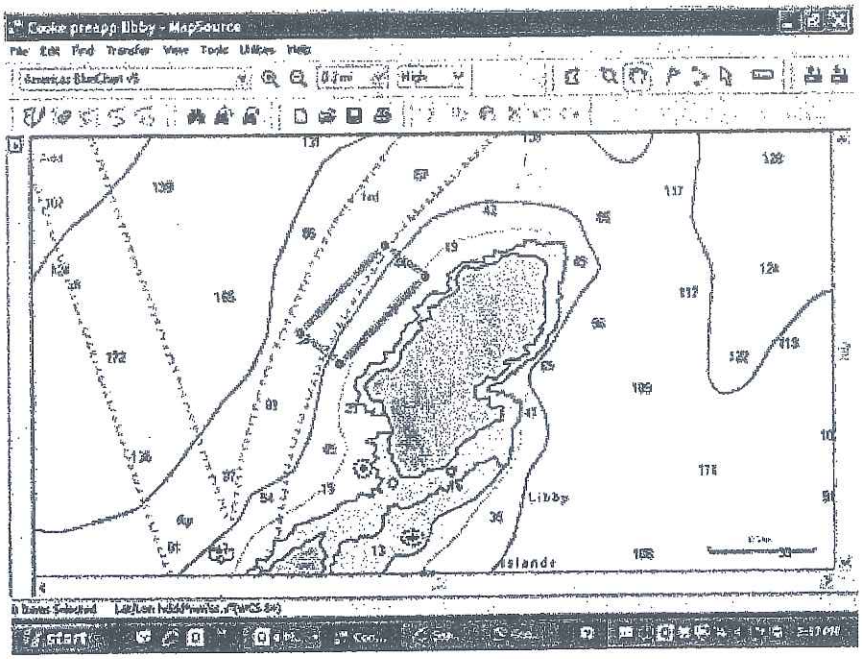


- The lease lies closer (reportedly within 500 ft. of HWM) and is significantly more intimate to western shoreline of island; situated even closer or directly adjacent to intertidal habitats considered an important component of seabird nesting island habitat.

Conclusions:

- This project application represents a continuation and escalation of non-compatible development due to the related disturbance and resulting displacement of functions and values on protected habitats of Big Libby Island.

- The applicant is requested to provide a full alternatives analysis to justify consideration of this proposal and its impacts given a greater than 20 year history of conflict at this site.
- The applicant has not provided information/data demonstrating that the proposed development would not interfere with significant wildlife habitat and marine habitat, and marine and upland areas to support ecologically significant flora and fauna; or would avoid interference with the public use and enjoyment, or otherwise the purpose of conserved lands acquired by the State to protect important ecological attributes; nor provided evidence that necessary provisions have been established which would mitigate the negative impacts of lights and noise (Section 2.37 (1)A (5), (7), (8), (9))
- The issues and objections raised by MDIFW staff to this project remain essentially unchanged over the past 23 years and are significantly heightened by the latest proposal which encroaches even closer to important wildlife habitat.
- The primary consideration for avoiding significant impacts on colonial nesting species in island settings is judicious site selection. Consistent with MDIFW management guidelines and long-standing recommendations in this matter, as well as in other, similar regulatory applications, it is our conclusion that the only effective means of integrating aquaculture development into this sensitive wildlife area is to move the proposed facility at least ¼ mile (1,320 feet) from Big Libby Island and its associated habitats.



Relevant Studies:

There is a large body of literature over many years that assesses and documents the impacts of disturbance in various forms on and near colonial nesting seabirds. It is this science that formed the basis for MDIFW adopting two regulatory applications to minimize impacts to seabird nesting islands: (1) the adoption of trespass restrictions on coastal islands managed under the Coast of Maine Wildlife Management Area and, (2) the development of management guidelines to buffer development minimally by ¼ mile consistent with federal regulatory applications.

The attached paper, Human Disturbance to Colonial Nesting Seabirds – Potential Concerns for Birds Nesting in Maine, was compiled by USFWS in approximately 2008. In addition, based on reviews from the above document and other references, the following are some particularly relevant findings:

Carney, K.M. and W.J. Sydeman. A Review of Human Disturbance Effects on Nesting Colonial Waterbirds. *Waterbirds* 22(1): 68 – 79, 1999.

A review of 64 published investigations concerning effects of human disturbance on nesting colonial waterbirds from human presence-related impacts found that ... "Though most studies found significant negative effects, taking careful measures minimized impact on some species..." Disturbance may discourage late nesting birds from settling in affected areas (i.e. entire island, or portion of the island)

Rueggeberg H. and J. Booth 1989. Interactions between wildlife and salmon farms in British Columbia: Results of a survey. Canadian Wildlife Service Technical Report Series No 67. 80 pp.

Objective was to determine appropriate planning, management, and husbandry measures to avoid detrimental impacts of wildlife on salmon farm and of salmon farms on wildlife. " ... the proximity of colonies or concentrations of marine birds is an important consideration and should be taken into account in the planning, approval, and establishment of salmon farms."

Spencer, N. and M Spencer-Famous 1993. An Evaluation of the Potential Impacts of a Salmon Aquaculture Facility on Waterbirds and Marine Mammals at Cross Island National Wildlife Refuge, Cutler, Maine. 71 pp.

A preliminary evaluation of the potential impacts of a salmon aquaculture facility on waterbirds at Cross Island National Wildlife Refuge, Cutler, Maine, with management recommendations for aquaculture facility siting. While some positives were noted from the development of underwater structure that supported various forms of marine life, the negatives included increased gull survival which could result in increased predation at colonial seabird nesting islands, gulls foraging at the pens may colonize nearby nesting islands and increase predation on other nesting seabirds, increasing levels of human disturbance may lower densities of disturbance-sensitive species, and the potential for entrapment in the anti-predator nets by diving waterbirds. The report specifically recommended that placement of aquaculture lease facilities should be prohibited within ¼ mile of significant seabird nesting islands.

Rodgers, J.A and H.T. Smith 1995, Set-back distances to protect nesting bird colonies from human disturbance in Florida, Conservation Biology 9: 89-99.

Birds nesting on remote islands (i.e. those with limited past disturbance) may be more sensitive to disturbance. They do not recommend that habituation be used to justify decreasing buffer size; Disturbance during the pre-laying period may decrease colony size, increase rate of site abandonment, adversely affect pair bonding, and influence nest site selection behavior

Hockin, D. M. Ounsted, M. Gorman, D. Hill. V. Keller, and M. Barker. 1992. Examination of the effects of disturbance on birds with reference to its importance in ecological assessments. Journal of Environmental Management. 36:253-286

Disturbance can interrupt feeding routines and food intake rates; in response to disturbance, chicks may regurgitate recently ingested food, resulting in reduced growth rates or starvation; disturbance of adults while feeding can lead them to shift foraging efforts to less preferred feeding areas, with potential impacts on breeding success through reduced food availability; responding to disturbance often involves energetically costly activities and can reduce the effectiveness of foraging and this ultimately may affect survival rates in the young birds; birds may also have to fly significant distances to find alternate feeding areas. This will affect their physical condition and may reduce time available to feed young.

Welch, L. 2008. Human Disturbance to Colonial Nesting Seabirds – Potential Concerns for Birds Nesting in Maine, unpublished agency document.

Continued disturbance may result in birds shifting their breeding distribution at a particular colony. In an effort to avoid disturbance, birds may establish nests in inferior habitat where they may face greater threats from weather events; If disturbance becomes significant, many seabirds will stop utilizing that site, and seek alternate nesting locations; Birds will not initiate breeding efforts if disturbance occurs at the time of courtship. Regular disturbance at this time can prevent a significant portion of the colony from establishing nests; Seabirds are generally more sensitive to disturbance in the early parts of the breeding cycle. If complete abandonment of nests occurs, it generally happens in the early part of the breeding cycle; the critical approach distance that is used by various mangers and appears to protect a variety of seabird species is 300 meters; Colonies will react to natural disturbances in a similar fashion, with adults taking flight, but these disturbance events generally do not last as long as the disturbance created by human disturbance; It is generally recognized that there are significant differences between species in their response to disturbance;

Erwin, M, 1989, Responses to Human Intruders by Birds Nesting in Colonies: Experimental Results and Management Guidelines, Colonial Waterbirds, 12(1): 104-108.

With relation to critical approach distance, recommended a 200 m buffer for common tern colonies, but concluded an additional 100m (i.e. 300 m total) would be required to protect birds during the nest establishment and egg laying period;

Stinson, C.H. 1988. Does mixed species flocking increase vigilance or skittishness? Ibis 130;303-304.

Nesting within a mixed colony may increase the birds' response to disturbance. The response by more sensitive species triggers a response in species that may generally be more tolerant

Piatt, J.F. B.D. Roberts, W.W. Lidster, J.L. Wells, and S.A. Hatch. 1990. Effects of human Disturbance on Breeding Least and Crested Auklets at St. Lawrence Island, Alaska. The Auk. 107:342-350.

Found that human disturbance led to high rates of non-hatching, nest abandonment, and increased chick death in auklets.